PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 23 April 2001 (23.04.01)	
International application No. PCT/AU00/01053	**Applicant's or agent's file reference** FP13346
International filing date (day/month/year) 05 September 2000 (05.09.00)	**Priority date** (day/month/year) 12 October 1999 (12.10.99)
Applicant TAPANES, Edward, E. et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

13 March 2001 (13.03.01)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Nestor Santesso
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. [redacted] name or two-letter code of that Authority may be ind[redacted] by the applicant on the line below:

IPEA/ _____

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA	Date of receipt of DEMAND

Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION

Applicant's or agent's file reference:

International application No.	International filing date *(day/month/year)*	(Earliest) Priority date *(day/month/year)*
PCT/AU00/01053	05/09/00	12/10/99

Title of invention
A method for weighing vehicles in motion and systems formed for that purpose.

Box No. II APPLICANT(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

Future Fibre Technologies Pty Ltd
20 Viewtech Place
Rowville, Victoria, 3178
AUSTRALIA

Telephone No.: + 3 9764 3088
Facsimile No.: + 3 9764 3099
Teleprinter No.:

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
AUSTRALIA	AUSTRALIA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

Arab Transport Research Ltd
500 Burwood Highway
Vermont South Victoria 3133
AUSTRALIA

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
AUSTRALIA	AUSTRALIA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

TAPANES, Edward E
20 Viewtech Place
Rowville, Victoria, 3178
AUSTRALIA

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
AUSTRALIA	AUSTRALIA

[X] Further applicants are indicated on a continuation sheet.

See Notes to the demand form

Sheet No. 2

International application No.
PCT/AU00/01053

Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet should not be included in the demand.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

GOODE, Jason R
20 Viewtech Place
Rowville, Victoria, 3178
AUSTRALIA

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
AUSTRALIA	AUSTRALIA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

BUCKMASTER, Rodney
500 Burwood Highway
Vermont South, Victoria, 3133
AUSTRALIA

State *(that is, country)* of nationality:	State *(that is, country)* of residence:
AUSTRALIA	AUSTRALIA

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State *(that is, country)* of nationality:	State *(that is, country)* of residence:

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State *(that is, country)* of nationality:	State *(that is, country)* of residence:

☐ Further applicants are indicated on another continuation sheet.

rnational application No.
PCT/AU00/01053

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is [X] agent [ ] common representative

and [X] has been appointed earlier and represents the applicant(s) also for international preliminary examination.

[ ] is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.

[ ] is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

WILSON, Stephen Henry
GRIFFITH HACK
509 St Kilda Road
Melbourne Victoria 3004
AUSTRALIA

Telephone No.: +61 3 9243 8300

Facsimile No.: +61 3 9243 8333

Teleprinter No.:

[ ] **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special addr ess to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination to start on the basis of:

[ ] the international application as originally filed

the description [X] as originally filed
[ ] as amended under Article 34

the claims [X] as originally filed
[ ] as amended under Article 19 (together with any accompanying statement)
[ ] as amended under Article 34

the drawings [X] as originally filed
[ ] as amended under Article 34

2. [ ] The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. [ ] The applicant wishes the start of the international preliminary examination **to be postponed** until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

[X] which is the language in which the international application was filed.
[ ] which is the language of a translation furnished for the purposes of international search.
[ ] which is the language of publication of the international application.
[ ] which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby elects **all eligible States** *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes **not to elect:**

See Notes to the demand form

Sheet No. 4..

national application No.
PCT/AU00/01053

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:			For International Preliminary Examining Authority use only: received	not received
1. translation of international application	:	sheets	☐	☐
2. amendments under Article 34	:	sheets	☐	☐
3. copy (or, where required, translation) of amendments under Article 19	:	sheets	☐	☐
4. copy (or, where required, translation) of statement under Article 19	:	sheets	☐	☐
5. letter	:	sheets	☐	☐
6. other *(specify)*	:	sheets	☐	☐

The demand is also accompanied by the item(s) marked below:

1. ☐ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney, reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ nucleotide and or amino acid sequence listing in computer readable form
6. ☐ other *(specify)*:

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

WILSON, Stephen Henry

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:
2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):
3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. ☐ The applicant has been informed accordingly.
4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.
5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

See Notes to the demand form

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

RECD 13 SEP 2001

PCT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SHW:LM:FP13346	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. **PCT/AU00/01053**	International Filing Date *(day/month/year)* 5 September 2000	Priority Date *(day/month/year)* 12 October 1999

International Patent Classification (IPC) or national classification and IPC

Int. Cl. [7] G01G 019/03

Applicant

FUTURE FIBRE TECHNOLOGIES PTY. LTD. et al

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

   [X] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of **6** sheet(s).

3. This report contains indications relating to the following items:

I	[X]	Basis of the report
II	[ ]	Priority
III	[ ]	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	[ ]	Lack of unity of invention
V	[X]	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	[ ]	Certain documents cited
VII	[ ]	Certain defects in the international application
VIII	[ ]	Certain observations on the international application

Date of submission of the demand 13 March 2001	Date of completion of the report 5 September 2001
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer **JAGDISH BOKIL** Telephone No. (02) 6283 2371

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU00/01053

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed.

☒ the description, pages **1-53**, as originally filed,
pages , filed with the demand,
pages , received on with the letter of

☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **54-59**, received on **22 August 2001** with the letter of **21 August 2001**

☒ the drawings, pages **1/6-6/6**, as originally filed,
pages , filed with the demand,
pages , received on with the letter of

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	**1-28**	**YES**
	Claims		**NO**
Inventive step (IS)	Claims	**1-28**	**YES**
	Claims		**NO**
Industrial applicability (IA)	Claims	**1-28**	**YES**
	Claims		**NO**

2. Citations and explanations (Rule 70.7)

None of the international search citations discloses or suggests the invention of the independent claims including the feature of a borehole with a vehicle load sensing device being located underneath the roadway as claimed.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A weigh station for a vehicle in motion on a roadway, including;

a load sensing device located beneath the surface of the roadway for measuring the load of a vehicle in motion travelling on the roadway above the device; and

processing means for receiving a signal from the load sensing device and for providing an indication of the weight of the vehicle.

2. The station of claim 1 wherein the load sensing device is located on a substrate member, the substrate member being of sufficient length to extend substantially entirely across the width of at least one lane of the roadway.

3. The station of claim 2 wherein the substrate member comprises an extrusion.

4. The station of claim 3 wherein the extrusion comprises a U-shaped channel.

5. The station of claim 3 wherein the extrusion comprises a flat beam located within a hollow conduit.

6. The station of claim 2 wherein the load sensing device comprises a plurality of electrical strain gauges supported by the substrate member.

7. The station of claim 2 wherein the load sensing device comprises an optical fibre supported by the substrate member.

8. The station of claim 7 wherein, the optical fibre is looped on the substrate member so that a plurality of runs of the optical fibre extend across substantially the entire width of at least one lane of the roadway.

9. The station of anyone of claims 1 to 7 further including an axle detector for detecting the presence of axles of a vehicle so that an indication of the number of axles of the vehicle can be determined.

10. The station of claim 9 wherein the axle detector is arranged on the surface of the roadway and extends across substantially the entire width of at least one lane of the roadway.

11. The station of claim 9 wherein the axle detector is arranged on the substrate member together with the load sensing device.

12. The station of claim 1 wherein the load sensing device is in a bore beneath the roadway and the bore is filled with a filler material after location of the load sensing device within the bore.

13. The station of claim 1 wherein the load sensing device includes a sensing fibre which extends substantially across the width of at least one lane of the roadway, a reference fibre, a coupler for coupling the sensing fibre and reference fibre, fibre sensor leads

connected to the coupler, one of the fibre sensor leads being connected to a light source for launching light into the sensing fibre and reference fibre, and the other fibre sensor lead being connected the processing means for receiving light from the fibres and analysing the light to determine the weight of the vehicle.

14. The station of claim 13 wherein the processing means includes a light detector connected to the said other fibre sensor lead, and a third fibre sensor lead connected to the coupler, the third fibre lead being connected to a second detector so that an indication of the weight of a vehicle can be obtained by the detectors based on phase demodulation.

15. The station of claim 9 wherein the axle detector comprises a piezo-electric strip.

16. The station of claim 9 wherein the axle detector comprises a fibre optic linear modelmetric interferometer comprising a multi-mode fibre connected to a single mode fibre patch chord, the patch chord being coupled to axle detector processing means for detecting a change in property of light in the multi-mode fibre in response to a change in the load or strain experienced by the multi-mode fibre.

17. The station of claim 16 wherein a light source is provided in the axle detector for launching light into the patch chord and multi-mode fibre.

18. The station of claim 16 wherein the multi-mode fibre has a mirrored end for reflecting light from the mirrored end back through the fibre so that the detector and light

source are arranged at one end of the multi-mode fibre and patch chord.

19. The station of claim 17 wherein the light source is arranged at one end of the patch chord and multi-mode fibre, and the detector at the other end of the multi-mode fibre.

20. The station of claim 1 wherein the load sensing device includes a single-mode sensing fibre including a Bragg grating, the single-mode fibre being connected to a single-mode fibre lead which is coupled to a coupler, the coupler having one arm connected to a light source and a further arm connected to a detector.

21. The station of any one of claims 1 to 20 wherein the load sensing device is located between 500 and 1000 mm below the surface of the roadway.

22. A method of forming a weigh station for vehicles, including the steps of;

locating a load sensing device beneath the surface of the roadway;

coupling the load sensing device to a processor for receiving signals from the load sensing device to enable those signals to be processed to provide an indication of the weight of a vehicle travelling on the roadway above the load sensing device.

23. The method of claim 22 wherein the step of locating the sensing device beneath the roadway comprises boring a hole beneath the roadway and locating the load sensing device within the bored hole.

24. The method of claim 22 wherein the step of locating the sensing device beneath the roadway comprises digging a trench across the roadway, locating the load sensing device within the trench and filling the trench and restoring the roadway above the load sensing device.

25. The method of claim 23 wherein the step of forming the bore hole beneath the roadway comprises the step of forming an entry ditch or trench beside the roadway to enable access of a boring device for boring the borehole beneath the roadway.

26. The method of claim 25 wherein the entry ditch or trench is restored to original form to render invisible the weighing station beneath the roadway.

27. A load sensing device for a weigh station which measures the weight of a vehicle whilst the vehicle is in motion on a roadway, the load sensing device including;

a substrate member; and

an optical fibre supported on the substrate member, the substrate member and optical fibre being of sufficient length to extend substantially across the entire width of at least one lane of a roadway.

28. The device of claim 27 wherein the device is connected to a processor which includes a light source and a detector, the light source being for launching light into the fibre and the detector being for detecting light from the fibre, the processor being for processing signals from the detector to determine, from a change in the characteristic of the signals, the weight of a vehicle travelling over the sensor.

29. The device of claim 28 wherein a single run of the fibre is arranged on the substrate member.

30. The device of claim 28 wherein the fibre is looped on the substrate member so that a plurality of runs of the fibre extend along the length of the substrate member.

31. The device of claim 27 wherein the substrate member comprises a generally U-shaped channel member having a base and two side walls, the fibre being supported on the base of the U-shaped channel member.

32. The device of claim 27 wherein the substrate member comprises a beam arranged within a hollow conduit, the fibre being arranged on the beam.

33. A method of weighing vehicles in motion on a pavement surface, including the steps of:

providing a load measuring device which respond to the load applied by the vehicle as the vehicle passes over the location of the device, the load measuring device being installed in a borehole and under the pavement surface and extending across at least one lane of the pavement surface;

providing an axle detector in order to determine the number of axles on the vehicle;

acquiring output signals from the load measuring device and the axle detector as a vehicle passes over the load measuring device and axle detector;

analysing the signal characteristics to determine vehicle information including the weight and number of axles of the vehicle; and

recording the vehicle information in a system database or displaying or transmitting the vehicle information locally and/or remotely.

34. A method for installing a weigh in motion load sensing device, comprising the steps of:

producing a substantially horizontal borehole across pavement lane(s) of a roadway using a boring techniques;

inserting load sending device into the borehole;

filling the remaining borehole void with filler material;

protecting sensor leads extending from the device; and

restoring the site of borehole entry to render the site invisible to vehicle operators.

35. The method according to claim 34 further including the step of providing an axle detector for determining the number of axles associated with a vehicle the weight of which is to be determined by the load sensing device.

36 The method of claim 35 wherein the axle detector is also inserted into the borehole.